REMARKS

The Examiner is thanked for his careful and very thorough Office Action.

Claims 1, 2, and 4-11 have been rejected.

Art Rejections

The art rejections are all respectfully traversed.

Rejection Under 35 USC 103(a)

Claims 1, 2, and 4-11 stand rejected under 35 USC Section 103(a) as being unpatentable over *Felde* in view of page 3, lines 17-18 of the present application.

The Examiner has suggested that page 3, lines 17-18 of the present application suggests that PCD and CBN tips are equivalent in the art. However, this is incorrect. The sentence relied upon by the Examiner is in the background of the invention and states, "In practice, thin layers of PCD or CBN are bonded to a disk of tungsten carbide substrate ranging from 60 to 100 mm in diameter." Stating that they are both bonded to a disk of tungsten carbide substrate does not make them functional equivalents. To the contrary, the present application clearly establishes that PCD and CBN are not equivalents.

Firstly, the PCD is primarily used in non-ferrous metalworking applications whereas CBN is used for machining ferrous materials such as gray cast iron. This difference is stated on page 4, lines 7 – 15:

> **PCD is primarily used in non-ferrous metalworking applications such as copper and aluminum or to machine plastics, rubber, synthetics, and laminates. It had also found widespread use in sawing and shaping medium-density fiberboard and chipboard in the furniture industry.**

> **Unfortunately, notwithstanding is superb properties, it reacts chemically with iron and steel and cannot be used to machine any steel alloy.**
>
> **Polycrystalline Cubic Boron Nitride (PCBN) is used for machining ferrous materials such as gray cast iron.**

Secondly, PCD is 3.6 times harder than tungsten carbide, and CBN is 2.8 times harder than tungsten carbide. This difference is stated on page 4, line 28 to page 5, line 2.

Page 5, lines 17-24 of the present application states:

> **The cost of polycrystalline diamond (PCD) and cubic boron nitride (CBN) are approximately the same. One might think, therefore, that absent diamond's inability to machine ferrous materials, there would be no practical use for PCBN which is less hard and less resistant to abrasion than PCB. Presumably because of the technical superiority of PCD over PCBN, no manufacturer recommends PCBN for wood, wood-composite products or plastics. Further, no toolmaker supplies tools for these applications.**

Thirdly, CBN can be maintained using modified grinding tools which is less than ten times the cost of an electrodischarge machine required by PCD. This difference is stated on page 7, lines 4-9 of the present application:

> **A profound advantage of PCBN over PCD in all but the largest operations, is that PCBN tools can be maintained using modified $20,000 grinding machines where PCD requires an electrodischarge machine**

> costing ten times as much. This makes on-site or near site service feasible, reduces tool repair costs, turnaround time, and the inventory cost of spares.

Fourthly, the present application teaches that CBN can be used on blades having a positive hook angle. In contrast, the conventional understanding is that PCD can only be used on very small or negative hook angles. This difference is stated on page 6, line 22 to page 7, line 3 of the present application:

> There are severe restrictions on tooth geometry of PCD tools, particularly the hook angle: the use of positive hook angles (as is usual with circular saws for woodworking) can cause PCD tools to chatter or to suffer fracture. (Hook angle is the angle of the leading face of the tooth: if the tooth is angled to pull workpiece material back toward the center of the blade, it is said to have a positive hook angle.) Thus use of very small or negative hook angles is necessary with PCD tools. The geometry of PCBN cutters however, can be made to very closely approximate those of proven carbide tools, i.e. positive hook angles can be used for faster and cooler cutting.

Finally, the difference between CBN and PCD is perhaps best illustrated in the experiment cited in the present application. Page 11, lines 6-11 of the present application states:

> A test was also run to compare an experimental PCBN saw with a conventional PCD saw. The operator who was using a PCD

> saw on a trial basis complained that the force required to push the saw through the material was excessive compared to a carbide blade. No problem was experienced with a PCBN blade, probably because the hook angle was comparable to that on a carbide blade.

Thus, the present application clearly establishes that CBN and PCD are not equivalents: PCD is primarily used in non-ferrous metalworking applications whereas CBN is used for machining ferrous materials; PCD is harder than CBN; CBN can be maintained using modified grinding tools which is less than ten times the cost of an electrodischarge machine required by PCD; and CBN can be used on blades having a positive hook angle whereas PCD can only be used on very small or negative hook angles.

According to the Federal Circuit:

> Determination of obviousness can not be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. There must be a teaching or suggestion within the prior, or within the general knowledge of a person of ordinary in the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in a way they were combined by the inventor.[1]

Accordingly, the Examiner has failed to establish a proper motivation for the suggested combination.

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[1] *ATD Corp. v. Lydall, Inc.*, 48 USPQ 2d 1321, 1329 (Fed. Cir. 1998).

Even if one were motivated to replace the PCD in the cutting tool of *Felde* with CBN, which Applicant strongly disputes, the asserted combination still would not support each limitation of Claim 1. Specifically, Claim 1 recites "**positive respective hook angles of 5 degrees or greater**". As stated earlier, the present application teaches that CBN can be used on blades having a positive hook angle. In contrast, the conventional understanding is that PCD can only be used on very small or negative hook angles. Therefore, it is understandable that *Felde* does not teach hook angles of 5 degrees or greater because the blades were designed to be treated with PCD and not CBN.

As determined in *Thrift,*[2] a rejection which "does not discuss the unique limitations" of the claims was held to be "simply inadequate on its face." In this case, a rejection was held "not supported by substantial evidence because **the cited references do not support each limitation** of claim 11." See *In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1443 (Fed.Cir. 1991)."[3]

Therefore, a prima facie case of obviousness has not been established by the Examiner. Accordingly, Applicant respectfully requests withdrawal of this rejection.

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[2] *In re Thrift*, 298 F.3d 1357 (Fed.Cir. 2002).

[3] *In re Thrift*, 298 F.3d at 1366 (emphasis added).

Conclusion

Thus, all grounds of rejection and/or objection are traversed or accommodated, and favorable reconsideration and allowance are respectfully requested. The Examiner is requested to telephone the undersigned attorney or Robert Groover for an interview to resolve any remaining issues.

Respectfully submitted,

N. Elizabeth Pham, Reg.No. 49,042

Customer Number 29106

Attorney for Applicant

11330 Valley Dale Drive, Dallas TX 75230

214-363-3038 *groover@technopatents.com* March 18, 2004